

Specimen No. 2. Much more highly coloured. Stripes brilliant orange, 7 stripes, 6 of them very prominent. Fins with orange-blotched webs giving them a colourful appearance when fanned out. Orange also in caudal fin.

The sexes may be distinguished in the adults by the pointed extremities of both dorsal fins and the anal fin of the male. These fins in the female have their posterior margins rounded. The dorsal and anal fins of the male are usually darker than in the females. This is particularly noticeable during the breeding season when the males' fins are sometimes jet black, which fact, no doubt, influenced the choice of both the generic and specific names.

An account of the breeding and other habits of the species has already been published (Shipway, 1947). Many line drawings, detailed figures and photographic reproductions are available so a figure is omitted in this case.

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THE SOUTHERN INVASION OF NORTHERN BIRDS DURING 1952

By D. L. SERVENTY, Nedlands.

INTRODUCTION.

In 1952 there occurred the most widespread and conspicuous irruption of northern Australian birds into the south that has yet come under the notice of naturalists. The species participating in the movement were mostly Kimberley birds, as, for example, the Black Kite (*Milvus migrans*), the Brolga (*Grus rubicunda*) and the Pied Goose (*Anseranas semipalmata*), but others, typified by the Letter-winged Kite (*Elanus scriptus*), were nomads from central Australia.

The movements were not confined to Western Australia; the whole of southern Australia shared in receiving this phenomenal immigration and some elements of it even reached New Zealand.

The causes of these movements are obviously related to the unusual sequence of weather conditions which has obtained in both northern and central Australia. Brian Glover, who has published a similar review to the present one for South Australia (*South Austr. Ornithologist*, vol. 20, pt. 8, December 16, 1952, p. 82) has pointed out that following a series of good seasons, culminating in the filling of Lake Eyre for the first time in recorded history, bird populations must have built up to super-normal levels. This would be due mainly to an extraordinarily high rate of survival of the young produced under these lush conditions. When the extremely severe drought followed almost immediately and the carrying capacity of both the far north and the centre was drastically reduced, the excess populations of the nomadic species sought survival in emigration.

Through the courtesy of Mr. G. W. Mackey, Deputy-Director of the Commonwealth Weather Bureau, I had the opportunity of inspecting the recent weather records of the northern and central Australian regions and the following broad generalisations may serve to give the meteorological background of the phenomena to be discussed in this article.

Northern Australia: The summer of 1949-50 enjoyed good rains throughout. The summer of 1950-51 was generally good, but became dry towards its close. This dry period, beginning in March 1951, continued until the drought broke early in 1953. The summer of 1951-52 was one of distressing drought throughout the north, being claimed locally to be the worst in the history of the Northern Territory.

Central Australia: The sequence of good and dry years followed a similar pattern to that obtaining in the far north. After good seasons in 1949 and 1950 dry conditions supervened in January 1951 and continued. The floods in the Lake Eyre basin began in 1949 and culminated in 1950, the filling of Lake Eyre reaching its climax in October when the deepest soundings, of 12-13 feet of water, were recorded.

The importance of an adequate recording of as many details as possible of the movement of birdlife caused by these series of weather conditions has been generally realised. Fortunately a fairly comprehensive survey of the position was made by the South Australian Ornithological Association in South Australia (Glover, *ibid*) and by the Western Australian Naturalists' Club in Western Australia, the results being reported in the present article.

The irruption has high-lighted one aspect of bird movement in Western Australia: the probable existence of a greater amount of regular seasonal movement between the Kimberley Division and the southern parts of the State than has been realised in the past. Some of the species which were concerned in the irruption of 1952 appear each year in the south as winter visitors supplementing local populations. Their numbers were swelled considerably in the winter of 1952 which fact suggests that the centre of

origin of the visiting birds in normal years is also the Kimberley Division, a point which may be definitely established when systematic bird-ringing is under way. It would appear that in the winter, the dry period in the Kimberleys, a certain proportion of the excess bird population moves south, a partial migration which varies in its incidence according to the severity of environmental conditions in the far north. Further reference to this subject is given in the discussion of particular species.

COVERAGE.

It was fortunate that several local naturalists were able to make journeys over various portions of the State during the year and so had an opportunity of contributing to the documentation of the phenomenon incidental to the carrying out of their other duties. It would be worth while to detail more particularly how the State was actually covered.

A useful preliminary tour was made by H. Tarlton Phillips and myself between October 2 and November 5, 1951, from Perth northwards, via Paynes Find, Mt. Magnet, Meekatharra, Mundiwindi, Roy Hill, Witteboom, Coolawanyah, Millstream, Roebourne, Onslow, Carnarvon, Geraldton and back to Perth. This survey revealed no evidence of an irruption except in the case of the Letter-winged Kite.

During 1952 the following journeys were made by naturalists collaborating in the present inquiry. On February 14 I made a trip from Perth through Spencers Brook, the Dale country and Beverley. Between April 29 and May 1 V. N. Serventy travelled between Perth and Augusta. On July 1 I made a trip through the Dale country, Greenhills and Cunderdin. Between July 9 and 14 N. E. Stewart, of the C.S.I.R.O., travelled from Perth to Northampton (he recorded mainly Black Kite occurrences). A. Douglas visited Dongara on July 23. J. H. Calaby and I made an overland trip from the Eastern States to Perth between July 20 and August 10, via Eucla, Balladonia, Norseman and Kalgoorlie. Between June 24 and August 8 V. N. Serventy travelled from Perth to North-West Cape, via Geraldton and Carnarvon. H. Tarlton Phillips made a voyage on the lighthouse tender "Cape Otway," from Fremantle to Cape Don and return between July 3 and September 5; he visited various islands and some of the coastal ports. E. J. Brownfield, of the Fisheries Department, made a motor tour from Perth to Derby between August 8 and 29, along the coast road (observations mainly on Brolgas and Ibis). Between August 31 and September 5 I made a tour from Perth around the South-west, via Bunbury, Pemberton, Nornalup, Albany, Kojonup and Perth. On September 9 I visited the Dale country, Beverley, Qualradling and Cunderdin. Between September 10 and 13 J. H. Calaby made a trip from Perth to Geraldton, Mullewa, Morawa, Carnamah and back to Perth. Between September 17 and 22 he travelled from Perth to Narrogin, Nyabing, Norseman, Kalgoorlie and back to Perth. Between October 27 and 31 he visited the Northampton district, via Mullewa and Carnamah. Between November 10 and 14 he travelled from Perth to Donnybrook and return via Darkan. From November 27 to December 10 I visited Coolawanyah Station by air and was able to travel over some 600 miles of country in the vicinity of that station, The Hooley and Tambrey.

In 1953 the following territory was covered. Between February 2 and 6 J. H. Calaby and I travelled from Perth to Pingrup and Lake Magenta, via the Williams and Wagin. J. H. Calaby visited Donnybrook and Darkan between January 19 and 22; Perth to Geraldton, Northampton and Mullewa between March 16 and 20, and Perth to Pemberton between April 3 and 6. Between April 13 and 17 I travelled to Bolgart, Wongan Hills, Morawa, Three Springs, Moora, Dandaragan and back to Perth.

The following ornithologists were able to make sustained observations in country centres: S. R. White (Morawa), D. N. Calderwood (Beacon), Mrs. R.

Erickson (Bolgart), P. E. Stone (Kellerberrin), E. H. Sedgwick (Wooroloo), I. C. Carnaby (Ballup), A. H. Robinson (Coolup), H. M. Whittell (Bridgetown) and R. Aitken (Nyabing).

Information from these, what might be termed authoritative sources, was supplemented by reports solicited from the general public on species which were more or less readily recognisable. Such information was gained through press publicity (*West Australian*, *Western Mail* and *Westralian Farmers' Gazette*) and radio announcements. The response was considerable. Nevertheless, as will be appreciated from Figs. 1 and 2, there were wide gaps in the coverage and the reported observations can only be considered as irregularly distributed samples of what actually took place.

The data are arranged in geographic sequence, broadly speaking from north to south, and where many reports came in these are sub-divided into convenient areas. Within each locality grouping the observations are set out in chronological order. Unless specified all the observations refer to the year 1952.

BLACK-TAILED NATIVE-HEN (*Tribonyx ventralis*).

The following reports were received:—

Carnarvon: John Lawson, of the Department of Agriculture, informed V. N. Serventy on July 4 that "these birds were in thousands a few months ago but there were none about now."

Mount Margaret (via Morgans): R. S. Schenk, of the Mount Margaret Mission reported that a few Native-Hens had appeared in the locality.

Geraldton: V. N. Serventy saw 8 birds at the Chapman River on June 28.

Dongara: A. Douglas came on small groups of up to 5 birds on July 23.

Morawa: S. R. White reported, under date August 25: "Appeared in small groups of up to 20 or 30 birds on dams scattered about the district last year [1951] after the rains in May and June. The biggest gathering I saw was just out of Three Springs to the east in salt lake country. There must have been about 50 birds there. Some are about again this year [1952], sometimes up to half a mile away from water, but as the season is a very dry one there is not the water lying about to attract large numbers."

Moore River: John Harper, of "Koorlan," Gingin, saw 20 birds in April.

Guildford: H. R. Harper saw a party of about 12 on May 10, about half-a-mile east of Barker's Bridge.

Perth: At the University grounds, Crawley, on May 2, J. C. and P. E. Serventy saw one bird near a small swampy pool.

Wooroloo: E. H. Sedgwick saw one bird in the creek bed on April 25. This was Mr. Sedgwick's second observation of the species in the South-west.

Coolup: A. H. Robinson reported that the first 3 birds were observed on August 31, but later in the year as many as 7 were seen. "This is probably more than were seen in 1948, the last time they were noticed."

Kukerin: A. R. Abbott reported 2 Native-Hens around his dam on July 1. Lake Gundaring (8 miles east of Wagin): R. Aitken, at the opening of the duck-shooting season on December 23, noted about 400-500 birds driven to the surrounding paddocks by the shooting.

Nyabing: J. H. Calaby saw 10 in one flock on September 18 at a Government dam 7 miles east. R. Aitken reported a count of 44 birds there up to October 24. They were present in one's and two's on all neighbouring dams.

Tenterden: L. S. Perkins reported one bird on May 1; "a strange bird in these parts."

Nornalup: Miss Hilda Preece noticed one bird on April 27; not known in the area before.

Balladonia district: I saw 2 birds on the dam at Nanambinia Station on August 6; Mr. Fred Dimer told me they were the first seen there for about 6 years.

Remarks: This species is one of the best examples of nomadism in Western Australia. It occurs all over the State and numbers may suddenly arrive in a district, usually after rains, and may depart just as suddenly. The year 1952 was not a big irruption year, judged by the standard of several previous invasions, but it was characterised by a widespread if small influx into most parts of the South-west. None came under notice during my North-west trip in October-November 1951 or on the visit to Coolawanyah and The Hoolcy Stations in December 1952. The irruption into the southern parts of South Australia was on a much greater scale (*S.A. Ornith.*, vol. 20, p. 83) and the first arrivals appeared on the Adelaide Plains about May 1951, being the earliest of the many invasion birds in that State.

Meteorological conditions in the South-west and the North-west of Western Australia do not appear to have been such as to account for the invasion which took place in the South-west. Our birds may have come from much further afield but in the absence of positive records, supported by ringing experiments, one feels loth, at this stage, to suggest that the bulk of the invaders came from such distant places as the Kimberley Division or the Lake Eyre basin. Rails, however, despite their seemingly indifferent powers of flight, are notoriously extensive wanderers.

PELICAN (*Pelecanus conspicillatus*)

It is not certain whether the Pelican should be listed as a component of the irrupting species, though there is evidence that the birds were more frequent than usual in the South-west in 1952.

From Morawa S. R. White on August 25 reported as unusual a number of Pelicans seen standing in crop near the salt lake area.

On the Swan River Estuary Pelicans were more conspicuous than usual. At Pelican Point birds were present throughout the winter months of 1952 and the numbers resting on the spit were greater than in previous years. In Perth Water the birds were uncommonly frequent; L. E. Sedgwick counted 20 adjacent to the South Perth ferry jetty channel on October 24.

At Coolup A. H. Robinson found Pelicans more plentiful than usual during December (1952) and January (1953). As many as 8 birds were being seen on his property at the one time.

BROLGA (*Grus rubicunda*)

Details of the reported occurrences are as follows:—

Between the Murchison River and Broome: E. J. Brownfield, Fisheries Department, Perth, reported the following observations on Brolga occurrences as encountered on a motor run from Perth to the Kimberley Division during August. The species was first met with on August 13, at the junction of the Carnarvon and Hamelin Pool roads, when one bird alighted opposite the water tanks (Tank No. 4). No more were seen until just after leaving Yarraloola Station, some 80 miles north of Onslow, on August 20, when a few were noted. The next occurrence was a large flock 16 miles north of Roebourne and from here on the species was seen quite frequently. A group of 12 birds was seen 50 miles north of Port Hedland. Along the Eighty Mile Beach

Brolgas occurred generally in groups of two or three, and at the northern end of La Grange Bay there was a group of 15. From La Grange Bay until about 50 miles south of Broome the country along the main road is fairly thickly wooded and in consequence no Brolgas were seen but they were fairly numerous in the open country 15 miles south of Thangoo Station. The largest concentration met with on the trip was near a small dam 5 miles north of Thangoo Station when almost 100 Brolgas were seen. There were flocks of birds intermittently all the way to Broome. None was seen on the run between Broome and Derby but the day was extremely hot and the country travelled through was fairly well wooded.

Beacon: H. A. Dunne saw one bird on August 27; a photograph and detailed description were sent to C. F. H. Jenkins (Government Entomologist). The bird was also seen by D. N. Calderwood.

Remarks: The Brolga, a northern and eastern species, extends rather sparsely from the Kimberley Division and has been recorded around the North-west coast as far as Yarraloola Station, north of Onslow. It would appear that this is a more or less recent penetration into the North-west as the species was never recorded by resident and visiting ornithologists, including Tom Carter, F. Lawson Whitlock and A. H. Robinson (the last-named of whom was in the North-west from 1923 to 1934).

The 1952 records extended the known range in Western Australia by some 650 miles.

STRAW-NECKED IBIS (*Threskiornis spinicollis*)

The following reports were received:—

NORTH-WEST:

Wallal: E. J. Brownfield saw a large flock 40 miles south of Wallal on August 22.

The Hooley Station: I saw one bird at the Kyaline Pool on December 5. Boologooroo Station: V. N. Serventy saw about 500 birds on July 17. The owner, H. Campbell, informed him that a flock of 2,000, the largest he had ever seen, had been there recently.

Carnarvon: V. N. Serventy saw 2 birds on July 4. He stated that John Lawson, of the Department of Agriculture, who had been stationed there for 4 years, had not seen any in the district before. On August 8 there were 20 Ibis near the aerodrome.

THE MIDLANDS:

Moonyoonooka: J. H. Calaby saw 1 bird on March 19, 1953.

Moora: Fisheries Inspector S. W. Bowler reported on September 2 seeing a flock of about 150 and the birds were present throughout from Moora to Geraldton. He had never seen the Ibis so plentiful before. J. H. Calaby saw 20 birds on October 27.

Walchling: J. H. Calaby on October 27 saw 7 birds at a point 17 miles south and 15 birds 10 miles south.

New Norcia: V. N. Serventy saw 4 birds on June 25.

SOUTH-WEST, COASTAL:

Bullsbrook: V. N. Serventy saw one bird on June 24.

Perth district: I saw 6 Ibis at Monger's Lake on April 22 and one at Herdsman's Lake on April 26. At Lake Karrinyup on February 24, 1953, I saw 2 birds.

Maddington: S. Taylor saw flocks of 6 to 20 from October 14 to 20.

Kelmseott: L. W. Newman saw 50 birds in June. J. H. Calaby saw 15 on November 10.

Pinjarra: I saw 1 bird on August 31, 6 miles south.

Coolup: A. H. Robinson reported on January 14, 1953: "This species was more common during the winter of 1952 than I have ever seen it before. Most of the flocks appeared to make back to a common roosting site north of Pinjarra. Approximately 300 left every morning and flew as far south as Hamel

and returned every evening along the same route. The total congregation at this roosting site certainly ran into many hundreds and probably thousands of birds. There are still up to 100 feeding around the swamps at 'Yanjettee.' " On May 17 at 5.15 p.m. I saw a flock of about 500 flying westward. On January 19, 1953, J. H. Calaby saw 9 birds.

Darkan: J. H. Calaby saw 20 birds, 10 miles S.E. on November 12.

Waterloo: D. N. Calderwood saw about 40 on March 28, 1953.

Dardanup: J. H. Calaby saw 5 on March 6, 1953.

Northcliffe: R. J. Neuzerling reported flocks of up to 7 birds on his farm in May; he had never seen the species before in the South-West.

Nornalup: Dr. B. Burnside reported 2 birds on June 6—the first he had seen in the district during his residence of 23 years there. The birds continued to be present until November 24.

Denmark: Fisheries Inspector L. G. Smith reported on June 20 that about 100 birds had been in the district for about three months.

WHEATBELT AND EASTERN:

Bencubbin: D. N. Calderwood saw one bird 6 miles north on April 28; this was the only bird of the species seen in the Bencubbin-Beacon district during the year.

Moorine Rock: Miss Margaret Nicholson reported that 13 birds appeared during September and fed on grasshoppers which were very plentiful at the time. The species had not been seen in the district previously.

Great Southern district: Brian V. Teague, of Narrogin, reported on February 3, 1953, that the first time he had seen this species was at Mt. Kokeby about five years previously. The next record was of one bird at the same place on October 21, 1952. On November 5 at Narrogin he saw a flock of 18 and then of 25; on November 1 there were 85 birds in one flock. On November 10 a flock of 8 was seen at Popanyinning; on November 12 there were about 30; on November 14 about 20 were noticed. On November 21 at Muresk 4 birds were seen. On November 27, at Youralling, two flocks of 8 each; at Popanyinning, 10. On November 30 there were about 20 at Popanyinning. No more were seen in the country between Narrogin and York until December 3 when 50 Ibis were seen in a new locality, at Josbury, 7 miles south-west of Williams; they were still there on December 8. On December 6 one bird was seen at Lake Yealering. On December 10 about 20 were again seen in Narrogin. On January 11, 1953, about 20 were seen 17 miles south of Williams.

Toollbin: Mrs. E. A. Basenberg reported on November 7 that for the past week up to 30-40 birds were present in the paddocks in the district and flying over; they were not known previously.

Tinkurrin (via Narrogin): Harold Masters reported on November 17, as strange visitors, flocks of Straw-necked Ibis; three weeks previously a neighbour had seen 200 on his property.

Mt. Barker: I saw 1 bird 20 miles north, on September 4.

Nullarbor Plain: P. M. Cornish, of Forrest, reported the species at Haig, as an unusual visitor. ("Gould League Notes, W.A., 1952-53," p. 28.)

Remarks: The Straw-necked Ibis is a resident species in the South-west but has only two main foci of occurrence, one in the Pinjarra area and the other around Gingin. In both districts breeding stations occur. Elsewhere the birds are infrequently encountered but in 1952 they were diffused in large and small numbers over a wide area in the North-west and South-west. I did not meet with any during my extensive North-west travelling in October-November 1951.

It would appear that most of the birds seen were visitors from the Kimberley Division, supplementing in the South-west the small resident population. W. B. Alexander (*The Emu*, vol. 20, 1921, p. 159) was of the opinion that the species had reached the south only within recent years and T. Carter stated that according to

his information it first appeared in the Albany district in 1892. Writing of the birdlife observed during his 11 years' stay at Point Cloates Carter stated (*The Emu*, vol. 3, 1904, p. 209): "As far as I can ascertain, the first record of this species in the district was in May, 1888, when numbers suddenly appeared, and neither natives nor settlers knew the bird, but Mr. J. Brockman informed me he had seen and shot a specimen some years earlier. After the break-up of the 1889-91 drought immense numbers were to be seen over the country. For some weeks they used to roost in thousands on some bare sand-drift hummocks behind the house at Point Cloates. In October, 1900, some hundreds of these birds bred and reared their young at Cardabia Creek, about 60 miles south-east from Point Cloates, and this is, I believe, the first record of this species having bred in Western Australia."

The recently-discovered papers of John Gilbert reveal that neither the Straw-necked Ibis nor the two Spoonbills occurred in southern South-western Australia during his collecting period (1839-43). It may quite well be that the establishment of the species in the south may have been due to periodic irruptions in the past century of the kind which took place in 1952.

WHITE IBIS (*Threskiornis molucca*)

This species had never been authoritatively identified from Western Australia south of the Kimberley Division. T. Carter in his account of the birds of Point Cloates (*The Emu*, vol. 3, 1904, p. 210) stated that "this ibis was not personally seen, but three reliable persons told me of having seen occasional specimens with flocks of *G. spinicollis*." During the 1952 irruptions similar reports were received, as follows:—

Gascoyne district: Hugh Thomson informed H. M. Whittell on March 4, 1953, that a White Ibis was seen about March, 1952 among Straw-necked Ibis at Moogooree Station, 180 miles N.E. of Carnarvon.

Coolup: A. H. Robinson stated that among the flocks of Straw-necked Ibis there were a few White Ibis. "These birds were described as pure white except for a black face, beak and legs, and a patch of black at the base of the tail or the tip. The only individual I saw was some distance away and appeared rather a dirty white."

Bunbury: D. N. Calderwood, whilst holidaying at Bunbury, saw one bird in a shallow lagoon on "Moorlands," between South Bunbury and Picton, on March 30, 1953. The bird was not seen in flight and in repose black was noted in the region of the tail. It was in company with a White Egret and two White-faced Herons.

Busselton: S. R. White reported on January 8, 1953, whilst on a visit to Busselton, that he had been reliably informed of the presence of one White Ibis among Straw-necks. "The two persons who told me this were under the impression that it was an albino but I consider it more likely to be a White Ibis that had moved down with Straw-necks."

Remarks: The White Ibis may now be added to the avifauna of that part of the State south of the Kimberley Division. The bird is evidently a very scarce straggler to the south, accompanying the Straw-necked Ibis. In view of Carter's remarks it may occur more frequently than the available records suggest, but owing to its comparative rarity has not come under the notice of knowledgeable observers.

JABIRU (*Xenorhynchus asiaticus*)

The only previous records of this species south of the Kimberley Division are of two specimens collected by the explorer F. T. Gregory in 1861 at Breaker Inlet, near Condon, and an observation by K. G. Buller near Well 49 on the northern end of the Canning Stock Route in 1943.

The only report received of the bird during the present survey was from A. Zuvela, of the Education Department, who saw a Jabiru at the Port Hedland marshes at the end of May.

WHITE EGRET (*Egretta alba*)

The White Egret is resident in the South-west and odd birds and small parties are not infrequently seen in the winter months. It has been difficult to deduce from the reports received to what if any extent there had been any material increase in numbers during 1952. Apparently some influx in the South-west population took place but it was not on anything like the scale of that which was exhibited by the Straw-necked Ibis and the White-necked Heron.

The following reports were received:—

Perth district: P. E. Serventy saw one White Egret and one Black-billed Spoonbill at Pellean Point on August 17. I saw one Egret at Lake Karrynyup on February 24, 1953.

Bunbury: On August 31 I saw 4 birds 7 miles N. and one bird 3 miles north. On November 10 J. H. Calaby saw 3 birds. D. N. Calderwood saw one at Australind on March 29, 1953; 2 at Bunbury and one near Pleton on March 30.

Busselton: S. R. White reported on January 8, 1953, that "the Egrets are more numerous than ever and I sometimes wonder whether they will become as in Queensland the dominant heron in the well-watered grassed areas and swamp vicinities."

Nullarbor Plain: P. M. Cornish, of Forrest, reported an Egret at Reid in April, 1952. ("Gould League Notes, W.A., 1952-53," p. 28.)

WHITE-NECKED HERON (*Notophoxyx pacifica*)

The following reports were received:—

NORTH-WEST and MIDLANDS:

Roebourne Tablelands: On December 4 I saw one bird at Ellawarrina Creek on Tambrey Station; on December 5 about 10 at the Kyaline Pool and one at the Bullawarrina Pool on The Hooley Station.

Carnarvon: V. N. Serventy saw one bird on July 11.

Northampton: J. H. Calaby saw one bird 2 miles west on March 18, 1953.

Geraldton: V. N. Serventy saw one bird on the Chapman River on June 28.

SOUTH-WEST, COASTAL:

Bullsbrook: V. N. Serventy saw 2 on June 24.

Baker's Hill: D. N. Calderwood saw one on September 20.

Childlows: D. N. Calderwood saw one on September 20 and one on August 13.

Perth: A bird was present for some days during April at the University pond, Crawley. It made repeated attempts at catching the goldfish there and was hunted away by the gardeners. I saw one at Mongers Lake on April 21

and one at Herdsmans Lake on April 26. The curator of Queen's Gardens reported one there at the middle of May. D. N. Calderwood saw 2 birds on the Esplanade and one near the Causeway on September 20.

Darling Range: A. Notley saw one at Carmel on April 25. L. W. Newman had a pair under observation at Roleystone for 18 weeks. I saw one at a roadside puddle 12 miles east of Midland Junction on August 10.

Maddington: I saw one on the road to the Bickley camp on August 19. S. Taylor saw the species repeatedly until December 22, 5 being observed on the one day.

Kelmscott: D. N. Calderwood saw one bird on March 28, 1953.

Armadale: I saw one bird 14 miles south on August 31.

Coolup: A. H. Robinson reported on January 14, 1953: "These birds are seen here every year but as the winter progressed there was a big influx and small travelling flocks were noticed. The species is very aggressive and each bird holds a feeding territory from which all other members of its own species are driven. Each swamp or swampy depression in a paddock which held water had its single heron, often in company with a single White-faced Heron. The big cleared swamp at 'Yanjettee' containing some 20 acres kept two herons at either end. As the small pools dried up numbers of the species were forced to concentrate on the more permanent waters and on November 19 I counted 35 White-necked Herons on a small swamp half-a-mile from Coolup. The highest number seen at the big swamp at 'Yanjettee' was 12 during December and this number is equal to the entire population during the winter scattered over numerous swamps and clayholes."

Pinjarra-Bunbury: On August 31 I saw one bird 4 miles north of Pinjarra and one 8 miles north of Coolup. On September 1 one bird was noted 20 miles south of Waroona and another 30 miles south; one was seen 7 miles north of Bunbury and 2 birds 8 miles north of Bunbury. On November 10 J. H. Calaby saw single birds at Pinjarra, Coolup, Wokalup and Bunbury. R. Hewison reported on September 22 that there were large numbers of these herons scattered around the district that were not in evidence in previous years.

Darkan: J. H. Calaby saw one bird 6 miles west on November 12.

Dennybrook: J. H. Calaby saw one bird 8 miles N.E. on November 10.

Manjimup: J. H. Calaby on March 5, 1953, saw two groups, of 15 and 2 birds, 5 miles north.

Nornalup: Dr. B. Burnside reported, on June 26, parties of up to 6 birds—the first he had seen in the district during his 23 years' residence. They were generally distributed. None was seen after October 27. On September 3 I saw 2 birds 28 miles west of Tinglewood and one at Tinglewood. Frank Thompson informed me then that they "were everywhere in the South-west now."

Denmark: I saw 1 bird 4 miles west on September 4.

Albany: I saw 12 birds together on September 4, 11 miles north.

WHEAT-BELT and EAST.

Beacon: D. N. Calderwood saw one after the opening winter rains and found it dead on May 9.

Jingymia: D. N. Calderwood saw one on August 10.

Kellerberrin: Phillip S. Stone stated, under date, May 4, 1952: "I have seen a few White-necked Herons this year. It is the first time since 1946 that I have seen them here."

Meekering: I saw one bird on September 9, 7 miles west.

Gilgering: I saw two on July 1.

Dangin: I saw one at a dam on September 9.

Beverley: B. M. Minchin saw a pair on one of his dams on June 20.

Kukerin: A. R. Abbott had one bird on his farm on June 29.

Highbury: J. H. Calaby saw one bird on September 17.

Kojonup-Williams: On September 4 I saw one bird 12 miles south of Kojonup. On September 5 I saw single birds 7 and 18 miles north of Kojonup and 15 miles north of Williams.

Nyabing: J. H. Calaby saw one bird 11 miles west on September 17 and 2 birds at Nyabing on September 18.

Pingrup: J. H. Calaby saw one bird on September 19.

Mt. Barker: I saw one bird 20 miles north on September 4.

Balladonia district: I did not see any during a visit in early August but Fred Dimer informed me that the birds "had been here in hundreds recently, at Balladonia, Nanambinia and Cantabinia." Some were seen until about the middle of July; there were about 15 in the largest flock.

Remarks: The White-necked Heron occurs all over Australia. In the southern parts of Western Australia it is rather a searee heron, though small numbers appear every winter, usually dispersed as solitary individuals on small swamps and pools. Occasionally influxes in considerable strength occur. During 1952 no great concentrations were reported, as has been the case with some previous visitations, but there was a very widespread dissemination throughout the south and the numbers present must have been, in the aggregate, very great indeed.

In the course of my North-west visit of October-November 1951 I saw only three birds of the species altogether—one bird each at Guildford, Coorow and the upper Gascoyne River (at Three Rivers Station).

It would appear that the influx each year is of birds moving out of the Kimberley region.

There was a general movement from north Australia southwards in 1952 and all the southern States received immigrants. A bird even turned up in New Zealand, at Canterbury, in mid-April 1952, the first record of the species there (R. H. D. Stidolph, *Notornis*, vol. 5, no. 2, October 1952, p. 38).

BLACK SWAN (*Cygnus atratus*)

It is questionable whether or not this species figured in the irruption. Whether a general increase in the numbers occurred or not is uncertain. However A. H. Robinson reported from Coolup that Black Swans were more plentiful there than they had been for at least 10 years. Two pairs nested at "Yanjettee"; nesting sites appeared to be at a premium and a number of birds did not breed.

PINK-EARED DUCK (*Malacorhynchus membranaceus*)

It appears that the numbers of this rather rare duck were reinforced during 1952 by visitors which may have been part of the irruption. The following records have been reported:—

Lake Clifton: A duck-shooter, Mr. Fell, gave me a detailed description of a bird he had shot, out of a party of 5-6, on February 20, 1953.

Gundaring Lake: R. Aitken stated that at the opening duck shoot on December 23 at this lake 7-8 Pink-eared Ducks were shot out of a total bag of 240.

Karakan Swamp (via Katanning): R. Aitken reported that at a shoot on January 28, 1953, one Pink-eared Duck was shot out of a total bag of 40.

Manjimup: "The West Australian" of July 14 published a photograph of a Pink-eared Duck shot in a local swamp.

Balladonia: I saw a party of 4 birds at the rock pool by the homestead on August 7.

PIED GOOSE (*Anseranas semipalmata*)

The following reports were received:—

Broome: Inspector M. Goodlad, of the Fisheries Department, reported as follows on March 13, 1953: "The Pied Geese commenced to arrive at Broome in 1952 around the same time as the Black Kite [April] and gradually increased in numbers until around the end of June. The birds became very tame and unafraid. They stayed on in Broome until January when the heavy rains came; the majority then migrated. Rough estimate of numbers would be 300-400 in the town at one time. When I arrived back in Broome on February 8 (after an absence in Perth since December 5) I observed 12 geese. The species very seldom visits Broome."

Roebourne Tablelands: On December 4 I saw a flock of 13 Pied Geese at a rock pool in Ellawarrina Creek, a tributary of the Sherlock River, on Tambrey Station. The birds were very tame and continually came back to the pool after being disturbed, some perching in river gums. One specimen was collected: ♂, weight, 5 lb. 8 oz.; moderately fat; small gonads. I was informed by R. Parsons that in August one bird had been seen at Coolawanyah Station (Quarrina Well); one came to Millstream Station and fed with the fowls; others were seen in the streets of Roebourne. R. Knowles, of Hamersley Station, informed me that 2 geese appeared at his homestead. E. W. Parsons told me that none was seen on any of the pools at The Hooley Station.

Lowendal Island (by Barrow Island): Surgeon-Commander G. D. Wedd of H.M.S. *Campania* saw 2 birds on October 13.

Carnarvon: V. N. Serventy saw 8 birds fly over the town on July 11 and head eastwards.

Mullewa: S. R. White saw a party of 5 between Geraldton and Mullewa in late August feeding quietly in a wheat crop no more than 40 yards from the roadside.

Swan River Estuary: J. W. Baggs saw 3 birds at Alfred Cove on February 1, 1953 (the observer became familiar with the species during a visit to the Kimberley Division in 1951).

Madura: H. Pinchin reported (through H. Tarlton Phillips) that at the beginning of August he was driving overland to Adelaide; when just beyond Madura he saw 2 Pied Geese at the side of the road (he was familiar with the species in northern Australia).

Remarks: The Pied or Magpie Goose is ordinarily an inhabitant of northern Australia and in this State does not range south of the Fitzroy River. Its occasional wanderings south of this river must apparently be very infrequent as the bird has been recorded by only one field ornithologist (Tom Carter) and its appearances in 1952 at even such places as Broome, Roebourne and other northern localities were hailed by the residents as very rare or unprecedented visitations.

In his account of the birds occurring in the region of North-West Cape Carter (*The Emu*, vol. 3, 1904, p. 210): "18th September, 1892, a small flock of these birds was resting on the beach at Maud's Landing and allowed me to ride past within a few yards of them without taking flight. . . . In 1900 numbers of these birds were on the flooded clay-pans near Winning." Carter is also responsible for the only published record of the bird from the southern part of Western Australia. In his paper on the birds of Broome Hill (*The Emu*, vol. 23, 1923, p. 135) he stated: "Only one Pied Goose came under my personal observation. On November 1, 1905 I walked to within five yards of one at my Broome Hill stock tank. It was evidently resting after a long flight, and flew away within an hour of my seeing it."

The present irruptions from the Kimberley region are clearly of a more extensive nature than any hitherto.

Even in the Kimberley Division and the Northern Territory, the normal home of the species, the drought conditions concentrated the bird into unusual haunts. The Perth *Daily News* in its issue of July 29, 1952 included the following report from its Darwin correspondent: "Starving geese and hawks are causing Darwin market gardeners thousands of pounds worth of losses. Denied natural feeding places because of the drought, the geese and hawks are plaguing market gardens and poultry farms. . . . Market gardener Rex McLaren said today geese had eaten 800 tomato plants, 1,000 cabbages and three plots of french beans. He estimated his loss at £500." On a visit to Darwin on July 30-31 H. Tarlton Phillipps saw some Pied Geese in the Botanic Gardens there.

SPOTTED HARRIER (*Circus assimilis*)

The Spotted Harrier has hitherto not been reported in the forested corner of the South-west of the State, the nearest known records being from Moora, Goomalling, Kellerberrin, Bruce Roek and Lake Graae. A. J. North (*Nests and Eggs of Birds . . . Australia and Tasmania*, vol. 3, 1911, p. 177) recorded it from King George's Sound, on the basis of George Masters' collecting, but the latter operated as far east as the Pallinup River and may have obtained his specimen to the east of the forested zone.

On May 17, about 3 miles south-west of Coolup railway station, A. H. Robinson and I were surprised to flush a Spotted Harrier from the ground. The locality was an expanse of open shrubby flat, surrounded by marri and jarrah timber. For an instant the grey of the upper parts of the bird suggested that it was a White-faced Heron. The characters of the bird were clearly seen, including the rufous under parts as the bird rose. Subsequently Mr. Robinson saw the species on a number of occasions.

On July 28 a specimen was shot at Bridgetown by Major H. M. Whittell. This was the only other record from the forested area, apart from the Coolup observations. At Bolgart, near the edge of the South-west forested area, I saw one bird on April 13, 1953.

In a motor run during September 11-13 from Perth to Geraldton, Mullewa, Morawa, Carnamah and back to Perth, J. H. Calaby recorded single individuals of the Spotted Harrier at the following localities: 5 miles south of Moora; 1 mile north of Watheroo; 5 miles east of Geraldton; Gutha; 15 miles north of Carnamah; 18 miles south of Carnamah, and 19 miles south of Carnamah. During my travel through the North-west in October-November 1951 I met with the Spotted Harrier as follows: October 27, Kyaline Pool, the Hooley Station (1 bird). November 2, near Kandarrrie Station (2); Minilya River (1). November 3, Hamelin Pool turn-off on the Carnarvon road (1); 13 miles south of this point (1).

It is difficult to state whence came the birds which had penetrated into the South-west. There may have been a reinforcement

of the more southern population from the Kimberleys or, perhaps, the arrival of the Black Kites in such unprecedented numbers had had a disturbing effect on other hawks. Apparently no undue increase in the strength of the Spotted Harrier was noted during 1952 in the North-west.

BLACK-SHOULDERED KITE (*Elanus notatus*).

The following reports were received:—

NORTH-WEST and MIDLANDS:

Ashburton district: I saw one bird on Kandarrle Station on November 1, 1951.

Carnarvon: V. N. Serventy saw one bird on July 13.

Geraldton: J. H. Calaby saw one on September 11.

Dongara district: Between Dongara and Mingenew on November 4, 1951, I counted 4 birds. J. H. Calaby saw one at Dongara on September 11.

Gutha: Miss Laural Ross reported one bird on September 17.

Morawa: S. R. White stated, under date August 23, 1952: "The Black-shouldered Kite appeared here about 12 months ago in numbers, and has been with us ever since."

Carnamah: J. H. Calaby saw one bird on October 27.

Coorow: John Read reported one bird in September.

Maya: Specimen received by the W.A. Museum on June 24 from Mrs. H. Elliott.

Walebing: J. H. Calaby saw one on September 10; on October 27 he saw 2.

Bindoon: On September 10 J. H. Calaby saw one bird 6 miles north; on October 27 he saw one 3 miles north and another 5 miles north.

Chitterling: The W.A. Museum received a specimen from K. Spice on June 30.

Perth district: The W.A. Museum received a specimen from Miss J. Stevens, Guildford, on October 4, 1951 and 2 from Mr. Chapman, Bentley Park, on March 6, 1952. At the beginning of April a bird was seen at Pelican Point by J. C. and P. E. Serventy. I saw 2 at Herdsman's Lake on April 26. P. E. Serventy saw one at Pelican Point on May 3. The W.A. Museum received 2 specimens on June 16 from Mrs. Bannister, of Cannington. J. H. Calaby saw one bird 9 miles east of Perth on September 10, and one 3 miles east of Midland Junction on September 23. The W.A. Museum received a specimen from H. Vaughan, of Nedlands, on October 22 and on December 31 one from Miss E. Williams, of Tuart Hill. J. H. Calaby saw 2 hovering over the Causeway on March 3, 1953, and a single bird at Bassendean on April 6. I saw one 3 miles north of Midland Junction on April 13, and one at the Causeway on April 17.

Armadale: The W.A. Museum received a specimen from J. K. McCormack on June 4, and one from Mrs. A. Pueker on August 18.

Coolup district: A. H. Robinson saw two single birds during 1952, one 2½ miles west of Coolup on June 17, and the other at Pinjarra earlier in the year.

Dardanup: R. Hewison reported 2 on April 24. D. N. Calderwood saw one on April 2, 1953.

Boyup Brook: The W.A. Museum received a specimen from M. G. Collard on February 26.

Bridgetown: H. M. WhitteU forwarded a specimen shot locally on May 13. He saw one himself on May 8, commenting: "I have not seen one for several years."

Nornalup: Frank Thompson, of Tinglewood, saw one in March, which remained for some time; it was the first he had ever seen of the species.

WHEATBELT AND GREAT SOUTHERN:

Pithara-Kalannie: D. Reid saw one bird between these two centres during the period November 28, 1951 to January 16, 1952.

Beacon: D. N. Calderwood reported that the bird was present in considerable numbers at Beacon, Cleary and Bencubbin during the period February 27 to July 4. Flocks numbering up to 11 individuals were encountered. On one day he recorded no fewer than 23 birds on a 28-miles trip between Beacon and

Beneubbin. The species was also noted at Koorda, Mollerin, Wialki and Marindo.

Goomalling: The W.A. Museum received a specimen from H. E. White on March 29.

Bolgart: Mrs. R. Erickson reported the species as being about on June 5.

Kellerberrin district: Phillip S. Stone reported some about 17 miles S.S.E. of Kellerberrin in January; still being seen at Kwoylin on May 15.

Burracoppin: Mrs. M. B. Mills reported that several birds had been seen in December, 1951, and which were new to the district. They were still present on October 24.

Mt. Barker: The W.A. Museum received a specimen from W. Gammon on February 14.

Remarks: The Black-shouldered Kite has an Australia-wide distribution but is not usually found further inland than about 300 miles from the coast. In the southern parts of Western Australia it appears only periodically (H. M. Whittell, *The Emu*, vol. 43, 1944, p. 294). A cycle of abundance began about 1935, accelerated since 1943 and waned by 1948. The bird became numerous again during 1952 but, from the observations of S. R. White at Morawa, the irruption must have begun some time in 1951. As detailed in the previous notes I saw only one Black-shouldered Kite in the North-west proper in October-November 1951 but came across 4 birds between Dongara and Mingenew. Of the 14 specimens received by the W.A. Museum from various correspondents during the current irruption, the first came in on October 4, 1951.

In 1952 the species spread right through the forested country of the South-west, as it did after 1943. Whence the newcomers came it is not possible to state with any certainty; the birds could be part of the surplus population of the Kimberley Division. The irrupting birds breed in the south and remain several seasons but so far they have been unable to establish permanent foothold.

LETTER-WINGED KITE (*Elanus scriptus*).

The following reports were received:—

Adele Island (about 25 miles N.W. of Yampi): H. Tarlton Phillipps on July 10 saw 10 birds circling around the light tower (field sketch of under wing pattern forwarded).

Abydos Station (Pilbara district): One bird seen by E. T. Bailey, of the C.S.I.R.O., in October, 1951, and again by the same observer on the coast between Roebourne and Onslow in the same month. I saw one on The Hooley Station on October 28, 1951 and another at Roebourne on October 31. A specimen was collected at Coolawanyah Station by R. Parsons on October 31 and forwarded to Perth for identification (W.A. Nat., vol. 3, p. 94).

Dongara: A. Douglas, of the W.A. Museum, saw one bird on July 23.

Gutha: Laural Ross, secretary of the Gutha Gould League Club, reported a bird seen in December, 1951 and which stayed for several weeks; a bird was seen on several occasions in 1952 (identification confirmed by teacher).

Pintharuka: A. Yewers reported (through S. R. White) that, about May, 7 birds appeared together at his property (description of under wing pattern provided).

Moora: C. L. E. Orton observed one bird at "Petworth Park" on April 7, 1953.

Pithara: J. C. O'Dea noted 5 birds on July 3 at East Pithara ("at first glance in the bright sunlight I thought they were sea gulls, until I noticed the broad black band, about one-third of the wing width, running the full length of the under wing. They settled quite near me, about 40 yards, and fortunately I had a telescope with me and by means of this had a very close view").



Fig. 1.—Invasion records of the Letter-winged Kite. The dots mark localities where the species had been identified in the period 1951-53.

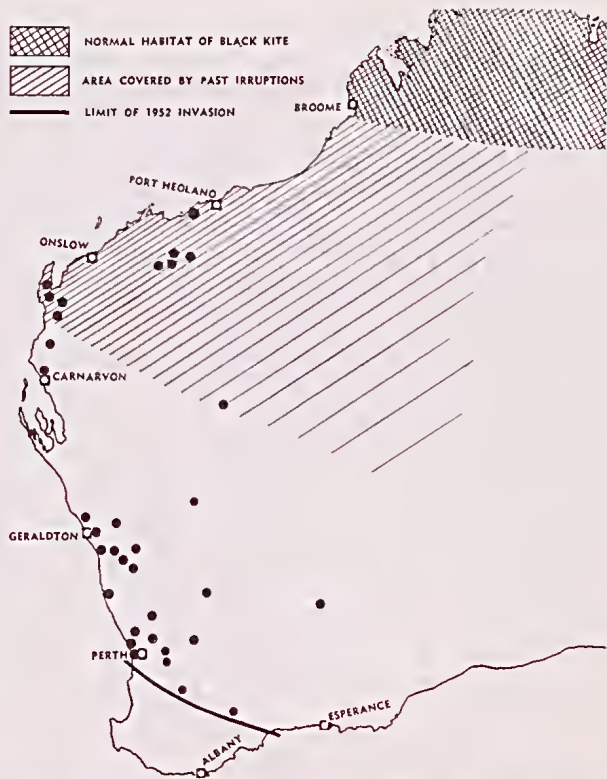


Fig. 2.—Invasion records of the Black Kite. The dots mark localities where the species had been identified in the period 1952-53.

Miling: Mrs. H. L. Jarvie forwarded a specimen to the W.A. Museum on December 14, 1951.

Booraan: Mrs. M. B. Mills reported 2 birds seen on February 3, 1953.

Burracoppin: Mrs. M. B. Mills reported that her brother saw 3 birds in September and which were new to the locality ("different from Black-shouldered Kite by having black markings underneath wings following the full length of the wings"; field sketch supplied).

Kellerberrin district: Philip S. Stone saw 5 birds about 17 miles S.S.E. of Kellerberrin in January; he saw one at Kwolyn on May 10.

Cunderdin: J. K. Griffin, of the Government School, forwarded to the W.A. Museum a specimen shot 3 miles north of Cunderdin on February 11, 1953 by B. Price.

Esperance: Mrs. J. S. Murray, of Dalyup Park, reported on December 5 that a group of 8 of these hawks appeared in the district recently; they stayed only two days. ("There was no mistaking the very distinct 'M' under the wings").

Remarks: Prior to the current irruption there was only one reliable record of the species' occurrence in Western Australia (nesting at Exmouth Gulf, 1943, I. C. Carnaby, *W.A. Nat.*, vol. 3, p. 95). The normal breeding range of the Letter-winged Kite lies within the inner arid regions of central and eastern Australia, and most of the published records are based on observations in the Lake Eyre and Cooper's Creek country. Broadly speaking the Letter-winged and Black-shouldered Kites may be said to have mutually exclusive distributions, but at times of irruption both may be found together.

The Letter-winged Kite is not an inhabitant of the Kimberley Division and so the drought in that area could not have directly influenced its movements. The remarkable invasions into Western Australia, representing a radial dispersal from its normal habitat, covered almost the whole of the State, reaching the sea coast and some of the neighbouring islands (Fig. 1). Though the numbers involved in this exodus were not as great as in the case of the Black Kite the movements of the Letter-winged Kite were probably more extraordinary in their unprecedented scope.

BLACK KITE (*Milvus migrans*).

The following reports were received:—

Broome: Inspector M. Goodlad, of the Fisheries Department, reported as follows on March 13, 1953: "The Black Kite frequents the Broome area and, being a scavenger, there was little attraction for the birds prior to the opening of the meat works some years back. The birds then, I am informed, commenced to flock to Broome in large numbers. The 2 years I was in Broome prior to 1952 I sometimes observed as many as 50 birds soaring overhead. Around April, 1952 the birds arrived in larger numbers. A rough estimate would be around 400-500 birds soaring in the air in one flock. These birds stayed on until I left Broome for Perth on December 5. I did not see any on my return to Broome on February 8, 1953. On March 11, however, I observed about 20 soaring overhead. At least the majority of the birds migrated from Broome during the early part of the wet season in January."

Mundabullangana Station (via Port Hedland): Mrs. R. F. Lukis reported on May 8: "We have Kite Hawks here now by the dozen but they do not normally live here. This is the second time they have visited this district since I've lived in the north (i.e. about 18 years). They seem to come here when things are tough in the Kimberleys."

Coolawanyah Station (via Roebourne): R. Parsons reported on June 11: "The Fork-tailed Kites have been with us about 4 months. It is not uncom-

mon to see at the homestead, as I did today, about 40 birds wheeling in the sky overhead." On September 11 he reported that the Kites were still present. They had declined in number when I visited Coolawanyah between November 27 and December 12, but some birds were about the Homestead every day, the greatest number being 13. A few were seen at The Hooley Station (fewer than 5 present at the homestead). R. Knowles informed me that there had been many at Hamersley Station but had now left.

Wittenoom Gorge: R. Nielsen reported on April 28: "They have appeared in hundreds at Wittenoom Gorge. I am a fairly recent arrival here but residents of several years say they have not previously been seen in numbers. They are not very numerous in the town of Wittenoom but seem to converge at the mine workings and settlement, 7 miles inside the gorge. Their constant wheeling in hundreds and their audacity become quite irritating and some of the men have been debating whether to make a drive on them."

Ashburton district: The following news item appeared in "The West Australian" of April 10: "Owing to the very dry conditions being experienced in the Kimberleys many thousands of kite-hawks, known as Kimberley hawks, were seen recently throughout the Ashburton district. These birds migrate in huge numbers when drought conditions begin in the Kimberleys and were last seen in the Ashburton in 1942."

Exmouth Gulf Station: V. N. Serventy saw 20 Kites on July 21.

Bullara Station: V. N. Serventy saw about 12 Kites on July 20.

Point Cloates: V. N. Serventy visited the district in July but there were no Kites present. G. C. Chittleborough, of the C.S.I.R.O., saw none whilst he was at the whaling station between August 6 and October 2.

Winning Pool: V. N. Serventy saw 50 Kites on July 19.

Mia Mia Station: V. N. Serventy saw about 50 Kites on July 19.

Minliya Station: The manager informed V. N. Serventy on July 17 that there were probably 2,000 Kites on the property. The birds first arrived in February.

Carnarvon: G. C. Chittleborough stated: "The bird was not noticed at Carnarvon during the 1951 whaling season (July-October), but large numbers (over 100 on some days) were seen on the beach and around the whaling station while I was there from June 1 to July 14, 1952. They were feeding on scraps from the factory. My daily notes on the species have been mislaid, but there was a tendency for the numbers to fall in early July. Passing through Carnarvon on August 4 I saw few Kites, but the whaling station, where the numbers were previously much higher, was not visited." V. N. Serventy reported on July 7: "Hundreds of birds are present, probably over a thousand. Usually in flocks but individuals can be seen throughout the area. Often 50-100 spiralling on rising air currents. Mixed flocks of Silver Gulls, Little (?) Crows and Kites near the Whaling Station." On November 27 I saw about 20 Kites at the aerodrome.

Bryah Station (near Peak Hill): W. Page reported that Kites were fairly numerous from about April to the middle of May; they arrived and departed suddenly. The last occasion on which they were seen locally was in 1942.

Mt. Magnet: C. Drew reported on May 5: "These birds, or birds very much like them, have been hovering over the town here for the last week. There were 5 here this morning."

MIDLANDS and SWAN COASTAL PLAIN:

Northampton: V. N. Serventy saw 20 birds on June 27.

Mullewa: S. R. White stated: "On August 22 I went up to Northampton for a run and on the way back I stopped the car about 10 miles out of Mullewa on the Geraldton side to admire a great gathering of Fork-tailed Kites soaring about on what was apparently a wind current. There must have been about 50 birds. This is the only gathering of its kind I have ever seen in W.A., but they were common enough in North Queensland."

Dongara-Geraldton area: The following observations were made by N. E. Stewart, of the C.S.I.R.O., during a visit from July 9 to 14: "On July 10 the first Kite was seen 200 yards from the Three Springs hotel. From there northwards they were seen frequently hovering over paddocks, stockyards, or even a dry tree, usually in small flocks of 6 or 7. At Northampton on July 11 P. Stuart, a farmer 6 miles east of Northampton on the Bowes River, complain-

ed of the damage the Kites were doing by killing myxomatosis-infected rabbits. There were 500 Kites on his property during the height of the disease and it was the first time local residents had noticed the birds in the Northampton area. Kites had been plentiful on the property of Mr. Williams, 3 miles N.W. of Northampton. On July 13 C. Culloton, manager of Glengarry Station 16 miles east of Geraldton, estimated 4,000-5,000 Kites feeding on sick rabbits close by the homestead when the myxomatosis epidemic was at its height in March."

Mingenew: D. Reid saw one bird soaring over the town on June 16; on June 19 two birds were seen flying low over the railway station. J. H. Calaby saw 20 birds on October 27.

Morawa: S. R. White reported a pair sweeping Morawa for some weeks during February and March.

Arrino: W. J. Turner saw about a dozen in mid-April eating at the carcass of a dead sheep; 1 were seen on April 26 and 2 on April 27. Forked tails noted.

Carnamah: A. N. Tapscott reported that on May 21 a Kite was seen on his property and 3 and 5 individuals were noted elsewhere. J. H. Calaby saw one bird 3 miles N.N.E. on October 27.

Cockleshell Gully (via Dandaragan): Mrs. Stella Gregson reported 6 Kites flying around on April 25, but 12 or more were seen by F. Gregson on another part of the property (forked tails clearly seen). The birds had never been seen in the district before.

Gingin: John Harper, of "Koorlan," reported on May 30: "The Kites arrived here very shortly after being reported at Lancelin. We have seen one concentration of 27 at the one time and I saw a flock which I consider was larger. There always seems to be an odd one about with an occasional bigger concentration. They have been here about a month."

Yanchep: Miss C. Drummond, of Claremont, saw between 30 and 40 Kites whilst returning to Perth from Yanchep on April 27. They were flying approximately 50 feet above the ground over an area, within the Yanchep reserve, which had recently been burnt by fire.

Perth: V. N. Serventy reported: "On April 14 Peter Slater informed me that the previous weekend (April 8-9) he had seen 3 Black Kites flying over Mongers Lake. They kept together while he watched them. I passed the information on to Don Reid on April 18 and on April 19 he saw 9 birds (forked tail noted). With my brother I paid three visits to the area (on April 21, April 22 and April 26), but it was not until the last date that one solitary Kite was seen at the western edge of the lake. A broadcast request for information brought a report that one bird had been seen at Mosmans on the Swan River on May 2. On May 4 I also saw one in the same area." B. J. Hutchinson, of Claremont, saw 12 Kites over Dalkeith on April 29, his attention being drawn to them by the cries of pursuing Magpies. The Kites came from a northerly direction and split up over Dalkeith, 1 headed east and 8 continued on south. The forked tails were clearly seen.

WHEATBELT and EAST.

Beacon: D. N. Calderwood reported that between March 3 and July 17 a single bird was observed on 18 separate occasions—there were at least two individuals.

Wyening: Father Michael, of the Wyening Mission, saw one Kite between Wyening and Callagirl on May 4.

Toodyay: A specimen was shot on June 29 and forwarded to the W.A. Museum by J. R. Masters.

Kellerberrin: Phillip S. Stone observed one on May 3 (forked tail noted); it was being chased by two Whistling Eagles.

Kalgoorlie: Peter C. Slater saw a bird on May 28 (forked tail noted). The Kite was also identified by Arthur G. Matthews.

Coonana (110 miles E. of Kalgoorlie): P. Slater, of the Government School, reported that in September 7 Kites were seen by local residents, the birds feeding on the rubbish tips. Mr. Slater saw one bird on February 20, 1953, and about 32 on March 26, after several inches of rain. (This information arrived too late for incorporation in Fig. 2.)

Gwambygne: D. Reid saw 3 birds on June 7, flying low over cleared ground.

Gilgering: On July 1 I saw a Black Kite in a paddock $\frac{3}{4}$ mile south of Gilgering railway siding.

Narrogin: J. H. Calaby saw one bird on September 17.

Pingrup: I saw one bird 30 miles east of Pingrup on February 4, 1953.

Remarks: The regular haunts of the Black Kite in Western Australia are in the Kimberley Division. Occasionally irruptions south occur, into the North-west pastoral country, where some individuals may stay to nest. Hitherto the extreme southerly limit of such visitations has been a line from about Point Cloates trending south-easterly to the Peak Hill district. Carter (*The Emu*, vol. 3, 1903, p. 33) refers to an invasion in the Point Cloates area in 1891 and another in 1900. On his visit to Millstream Station on the Forteseue River in 1922 F. Lawson Whitlock saw one Black Kite inland of Roebourne on July 23. Along the Canning Stock Route O. H. Lipfert collected specimens at Well 8 (near Weld Spring and 154 miles north of Wiluna) in May 1930 and others in the vicinity of Godfrey's Tank between January and March 1931.

K. G. Buller travelled along the Canning Stock Route in 1942 and 1943. On the southern section, from Wiluna to Well 22 (McKay Ranges) he met with the Black Kite only once, at Well 16 (270 miles north of Wiluna), where a small flock was seen on September 16, 1942. On the northern section, from Hall's Creek south to Well 23 he met with the species constantly as far south as Well 31 (473 miles north of Wiluna) between June and November 1943, most being seen in the vicinity of Godfrey's Tank in July. The birds appeared to follow droving parties south from Moola Bulla Station in the Kimberleys.

In 1942 there appears to have been a considerable visitation generally in the North-west. In May 1944, C. F. H. Jenkins recorded the species at Marble Bar (*Emu*, vol. 47, p. 38).

The 1952 irruption, as detailed in the preceding paragraphs, was on an unprecedented scale. The Kites swarmed throughout the North-west, the earliest being reported in February and before the middle of April had reached Perth. This invasion of the south was the first on record since the State was founded in 1829, and advanced the known southern limit of the species' occurrence by some 500 miles (Fig. 2).

Breeding in the south in 1952 has not come under the notice of any observer; this has, however, been reported in South Australia.

It will be interesting to study the future of this invasion. In the past no permanent settlement has followed the irruptions, which may no doubt be partly due to the competition of other raptors when normal environmental conditions returned. The big invasion of 1952 has, however, brought the Black Kite in strength to areas where human settlement has considerably changed the pre-existing ecological set-up. Not only have habitats been drastically altered but the relative abundance of some of the resident raptors has been affected. Whether the Black Kite may, in the new situation, find its survival prospects better than heretofore is an interesting speculation.